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ABSTRACT

A study involving 109 male and 116 female high achieving high school students (ages 16-18) and their parents investigated the causal linkages among home environment, self-concepts, prior ability, and socioeconomic status on mathematics achievement, science achievement, and Scholastic Aptitude Test-Quantitative (SAT-Q) and Verbal scores. Students were from 47 schools, had a mathematics and/or science grade point average of 86 percent and above, and had been placed in a gifted class in their schools. One hundred fifty-three participants were also semi-finalists or finalists in the Westinghouse Talent Search. Results of the study showed that prior ability played a major role in influencing the child's educational achievement; males perceived much more parental pressure than females; boys showed a greater math self-concept than females; boys exceeded girls in scores on the SAT-Q and Verbal score; and socioeconomic status was a major contributing force for family processes and offered a positive connection with prior ability. A key finding indicated that pressure for intellectual development had direct negative effects on self-concepts for both males and for females, while exhibiting positive effects for females' math achievement. An appendix includes a graph showing the links between the different variables. (Contains 22 references.) (Author/CR)

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FAMILY PROCESSES, SES, AND FAMILY STRUCTURE DIFFERENTIALLY AFFECT ACADEMIC SELF-CONCEPTS AND ACHIEVEMENT OF GIFTED HIGH SCHOOL STUDENTS

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Family Processes, SES, and Family Structure Differentially Affect Academic Self-Concepts and Achievement of Gifted High School Students

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Abstract

The focus of this study was to determine the causal linkages among home environment, self-concepts, prior ability, and socioeconomic status on mathematics achievement, science achievement, Scholastic Aptitude Test-Quantitative and Verbal scores. The Walberg Productivity Model served as a basis for analyzing the interconnections among the family processes. Campbell's Differential Socialization Paradigm was the theoretical framework used to analyze gender differences. The study was conducted with high achieving high school students (109 males and 116 females) and their parents (357) from New York City, and Nassau and Suffolk Counties in New York. PLSPath results showed that prior ability played a major role in influencing the child's educational achievement. A key finding was that press for intellectual development had direct negative effects on self-concepts for both males and for females, while exhibiting direct positive effects for females' math achievement.

Introduction

The home environment is one of the major influences on student learning (Walberg, 1984). The parents are influential in the creation of the child's self-perceptions, motivation, and his/her awareness of the sociological environment. By parental reinforcement, the psychological aspects of positive and negative self-images are established.

Throughout the child's development the parents exert differential socialization patterns for boys and for girls. Campbell (1994) hypothesizes that numerous socio-psychological variables are applied differentially. Over time, these differential treatments result in gender inequities (Eccles, 1982; Linn, 1986).

A subfactor of home environment is socioeconomic status. Campbell and associates (1994) have shown that this composite variable of socioeconomic status influences achievement indirectly through intervening variables such as family processes, academic self-concepts and prior achievement.

The purpose of this study was to analyze the specific envrironmental, educational, and demographic factors and their influences on the math and science achievement, and the Scholastic Aptitude Test scores of gifted high school males and females.

Theoretical Framework

Family environment is one of the most important influences in the development of a child's cognitive abilities and orientations (Marjoribanks, 1979). Children's attitudes toward discovery and learning initially stem from the home. At home, the parents influence their child's learning, create an attitude toward school, establish respect for teachers, and help to nurture educational aspirations (Svrcek, 1991).

Therefore, the family processes were examined from the parents' and child's point of view with regard to pressure, psychological support, help, monitoring and press for intellectual development.

Studies of gender role socialization have shown that males are socialized to compete with peers and to show independence and masculinity (Eder & Parker, 1987) whereas females are socialized to be nuturing and supportive. Parents exert varying amounts and types of parental processes on their sons that differ from those exerted on their daughters. Caudle (1991) confirmed the idea that American parents give more academic guidance, support, and have higher educational aspirations and expectations for sons than daughters.

Campbell (1994) calls the combinations of socio-psychological variables used by socializing agents, socialization tunes. These tunes are subtle and easily missed. Campbell (1994) separates the socialization process into micro-and macro-inequities. The social agents impose micro-inequities, which are small gender differences, and macro-inequities which are the observable gender differences. Campbell (1994) defines a macro-inequity as an effect size that exceeds g=.20, gender differences below this value are labeled micro-inequities.

Differential socialization tunes are reinforced by several social agents (teachers, neighbors, peers, community members, and the media) and are played year after year over macro-times. Society's members unknowingly perpetuate the socialization process and consequently existing sex roles remain (Campbell & Beaudry, 1996).

The general self-concept and the academic self-concepts are key components as influences on student learning (Wang, Heartel & Walberg, 1993), and are critical variables in the educational process (Marsh, 1990). Subject-matter self-concepts are important elements in creating a strong relationship toward academic subjects, more so than general self-concept (Shavelson & Bolus, 1982). It is important to understand how an individual's general self-concept relates to their academic self-concepts. Haladyna, Olsen, and Shaughnessy (1982) found that students with high confidence in their ability had more positive feelings about certain subjects than students with low confidence.

Campbell and his colleagues (1994) reported that the socioeconomic status played an important role in student's academic growth. Therefore, this study included the socioeconomic status of the family, which was determined by father's and mother's education and occupation. Personal and demographic characteristics as they relate to the dependent variables were analyzed.

Methods

Sample

The study was conducted with a total of 47 school participating; 41 public and 6 private. The target population of the study was gifted high school students in attendance during the 1993-94 and 1994-95 school years. These students have a mathematics and /or science grade point average of 86% and above and who have been placed in a gifted class in their school. The subjects ranged in age from 16 to 18. One hundred fifty-three participants were also semi-finalists or finalists in the Westinghouse Talent Search.

Operational Definitions

The factors used in this study were developed by a series of factor analyses. The five parental process factors represent a synthesis of perceptions from parents and their children, and three endogeneous factors involved school-related variables from the students' perspective. They were general self-concept (GSC), math self-concept (MSC), and science self-concept (SSC).

An endogeneous composite variable called prior ability was created by combining general grade point average (GGPA), number of advanced placement courses taken (AP), and whether or

not the student was a Westinghouse Talent Search contestant (WW).

The study's exogeneous structure variables were: a composite socio-economic status variable created by combining the father's and mother's educational levels and occupational statuses. The educational level and occupational status were defined operationally by assignment of a numerical value determined by the Nam-Powers Scale (1983). The marital status (one-parent or two-parent families) was obtained from self-reported data.

The four outcome variables used were math grade point average (MACH), science grade point average (SACH), Scholastic Aptitude Test-Quantitative (SAT-Q), and Scholastic Aptitude Test-Verbal (SAT-V).

Statistical Analysis

Gender differences were analyzed to study the different patterns of the predictor variables and achievement, by calculating effect sizes and t-tests. The effect sizes were computed according to a pooled variance formula derived by Hedges (1986).

PLSPath analysis was employed using a partial least-squares approach to estimate the parameters of the path model. This PLSPath program included Jackknife procedures which randomly selected one case at a time and re-estimated the model parameters on the remaining cases. This procedure produced Jackknife path coefficients (direct and indirect effects), Jackknife standard errors, and R^2 values.

The PLSPath program included subroutine for creating second-order factors. If the factor loadings derived for the first-order factors did not load sufficiently, it was removed from this grouping and entered separately in the path analyses. For each of the males' analyses, the level of the father's occupation (FOCC), the child's perceived parental support (CSUPP), and the child's perceived parental help (CHELP) were entered as separate factors.

Results

Effect Sizes

The effect size calculations revealed five significant gender differences. Males perceived much more parental pressure than females (g=.64, macro-inequity). The students showed that of the four SES factors only mother's education (g=.21, macro-inequity), had a greater impact on the boys' mean scores than the girls' mean scores. Family size/2p (g=.29, macro-inequity) favored the males over the females. The boys showed a greater math self-concept (g=.20, macro-inequity) than females. In terms of SAT-Q (g=.25, macro-inequity), the boys exceeded the girls and on the verbal component (g=.18, micro-inequity) the trend was in favor of the boys.

Multiple Regression Analyses

Hierarchical regression results indicated that general grade point average, advanced placement, and Westinghouse award winner were the best predictors of the four dependent variables.

Path Analyses for Gifted High School Male and Female Students

Path analysis results of significant direct and indirect path coefficients can be found on Figures 4.1-4.8a. Results of the models revealed that prior ability was the best predictor. Support and pressure were negatively associated with gifted high school males' achievement. Help and two-parent families proved to be advantageous to the males' achievement.

Females in high SES families proved to be an asset for achievement. Families with high SES administered more of the parental processes and were found to be associated with higher prior ability. Copious resources and help were dysfunctional for female results.

Discussion

As a whole the family processes, although important to the males' self-concepts, do not offer lasting positive effects on achievement. Do the sons see themselves as being intellectually superior and independent? The differential socialization process may be the reason for the sons' adversarial position. Males who possess this sense of superiority will be more apt to be risk-takers knowing that they will probably not make a mistake. In our present day society sons are acculturated to be independent and females are expected to rely more on the family for assistance (McGill & Rigsby, 1973; Stage & Maple, 1996). Females are socialized to be 'people pleasers' and are kept sheltered and cling to the immediate family. Females are more responsive to parental pressure.

Results of this study showed that two-parent families were important for males' success. Although males wish to be independent and free of their parents' imput, they also need to know that their parents are there for family stability and security. The presence of two adults relieves the sons from having to make important household decisions.

These analyses revealed that general self-concept and subject matter self-concept did not plan an important role in achievement. The general self-concept was found to have no effect on any of the study's dependent variables. Similiar results have been noted by other researchers (Keith, Pottebaum & Eberhart, 1985; Marsh, Smith & Barnes, 1985). These gifted children know they have the ability to succeed. So, it's not their self-concepts that promote achievement but rather their experiences that have met with success.

SES was a major contributing force for the family processes and offered a positive connection with prior ability. However, these family practices negated achievement. Observation of adolescent females shows that they are more likely to be in competition with one another with regard to material objects that high SES families can provide. Within the males' results, it was found that the level of the father's occupation benefitted the child's perceived psychological support which in turn increased the child's general self-concept.

Conclusions

The results to this study must be integrated into the body of research provided to teachers and administrators so that they may encourage activities that will foster high achievement. Female teachers who are interested in math and science should be hired to serve as role models to promote the opportunities available to those who are competent in these skill areas.

Contrary to Peterson and Fennema's (1985) findings that females' math achievement was negatively related to the competitive atmosphere and positively correlated to the classroom climate, the results of this study confirmed the fact that prior ability was the leading contributor to achievement. Therefore, it is necessary for the schools to promote more contests and participation in these competitions. It is through these successful experiences that achievement is reached.

It is necessary for the educators to identify the differential socialization tunes and break the established mold. Equity between genders must be established. To alleviate this bias

atmosphere, establishment of a support group and mentoring in high school is necessary. Mentors provide the guidance, encouragement, and friendship that gifted students require. Elimination of sexual bias and stereotyping in the math curriculum is necessary. Encouraging females to enroll in advanced placement courses and technical areas, aspiring to professional careers, and career awareness must be an ongoing concept at all levels.

The schools must reach the parents. School administrators must instruct parents in motivational practices including the use of increasing psychological support, offering moderate levels of help and decreasing the amount of pressure applied. Parents must provide encouragement, a place of warmth and high expectations, and security to take positive risks.

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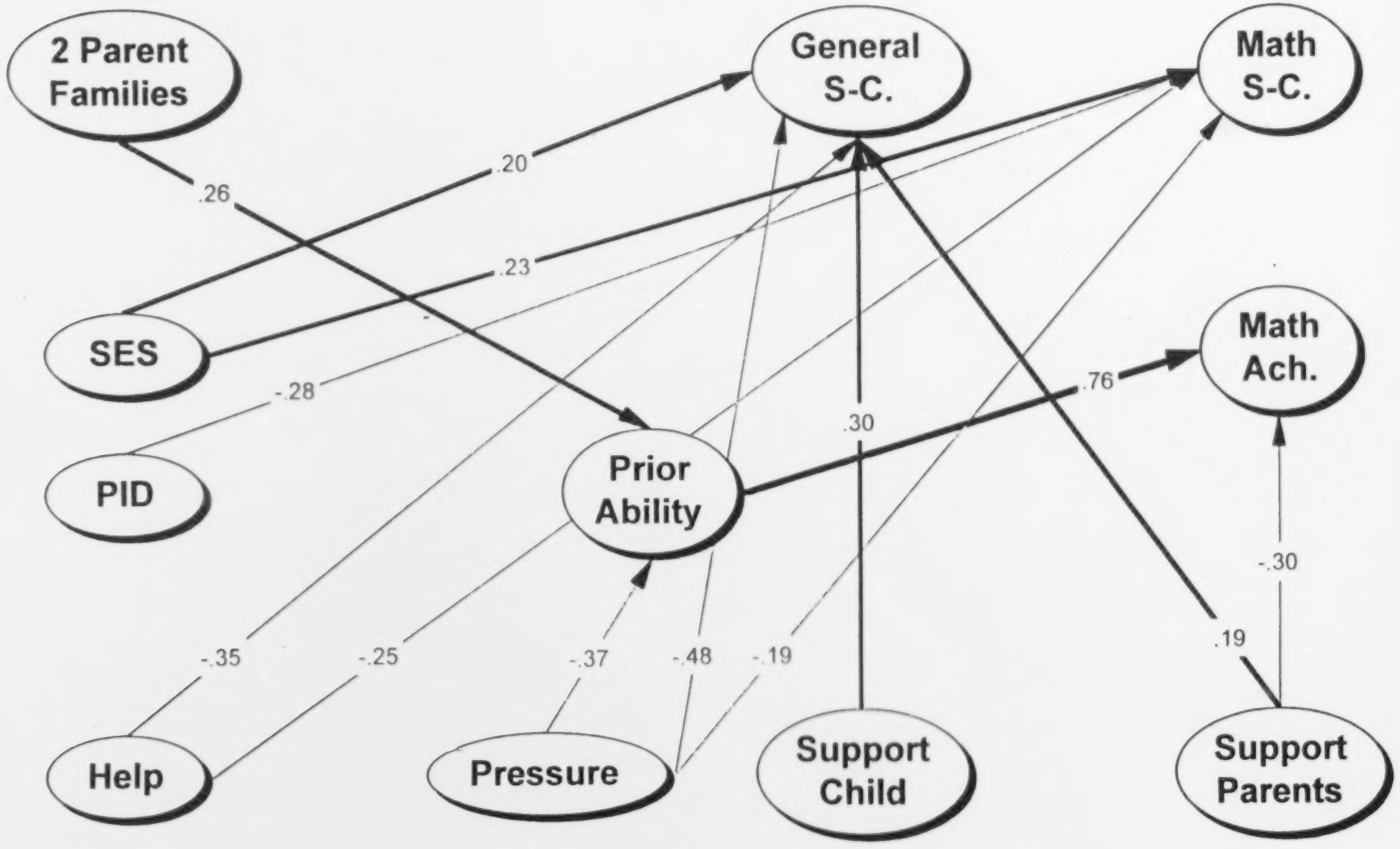

Figure 4.1 Gifted Males Math Achievement

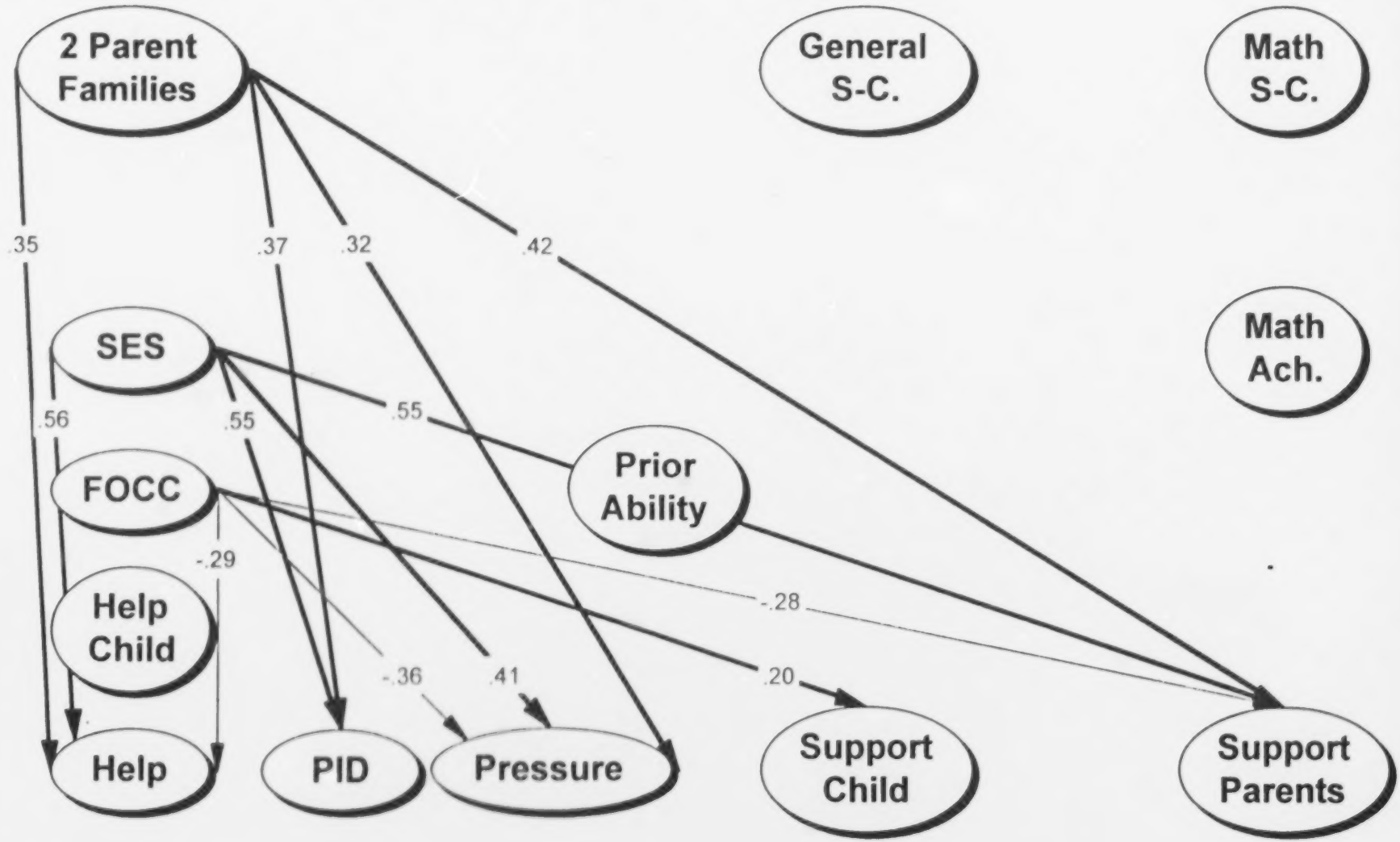

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Figure 4.1a. Gifted Males Math Achievement

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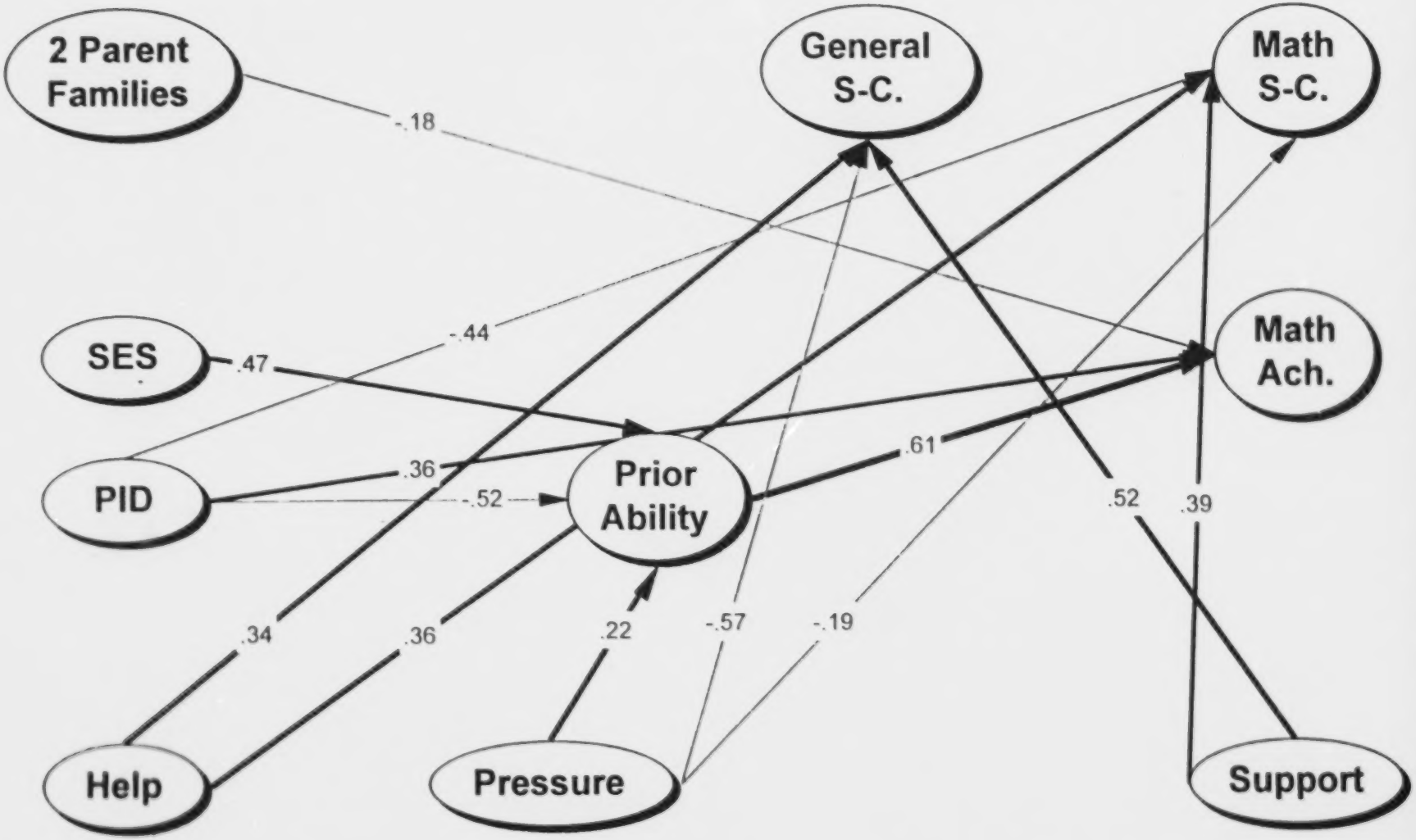

Figure 4.2 Gifted Females Math Achievement

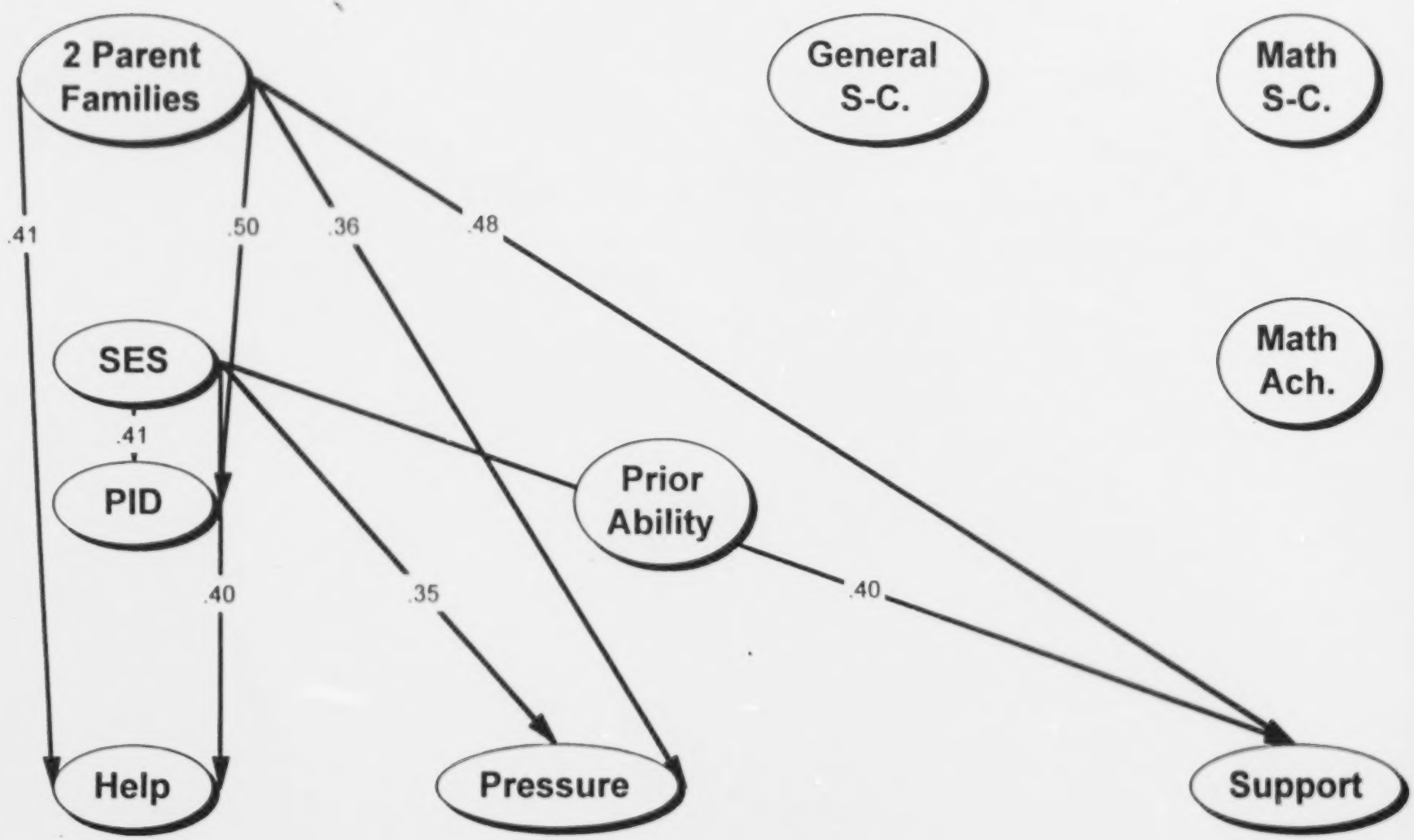

Figure 4.2a. Gifted Females Math Achievement

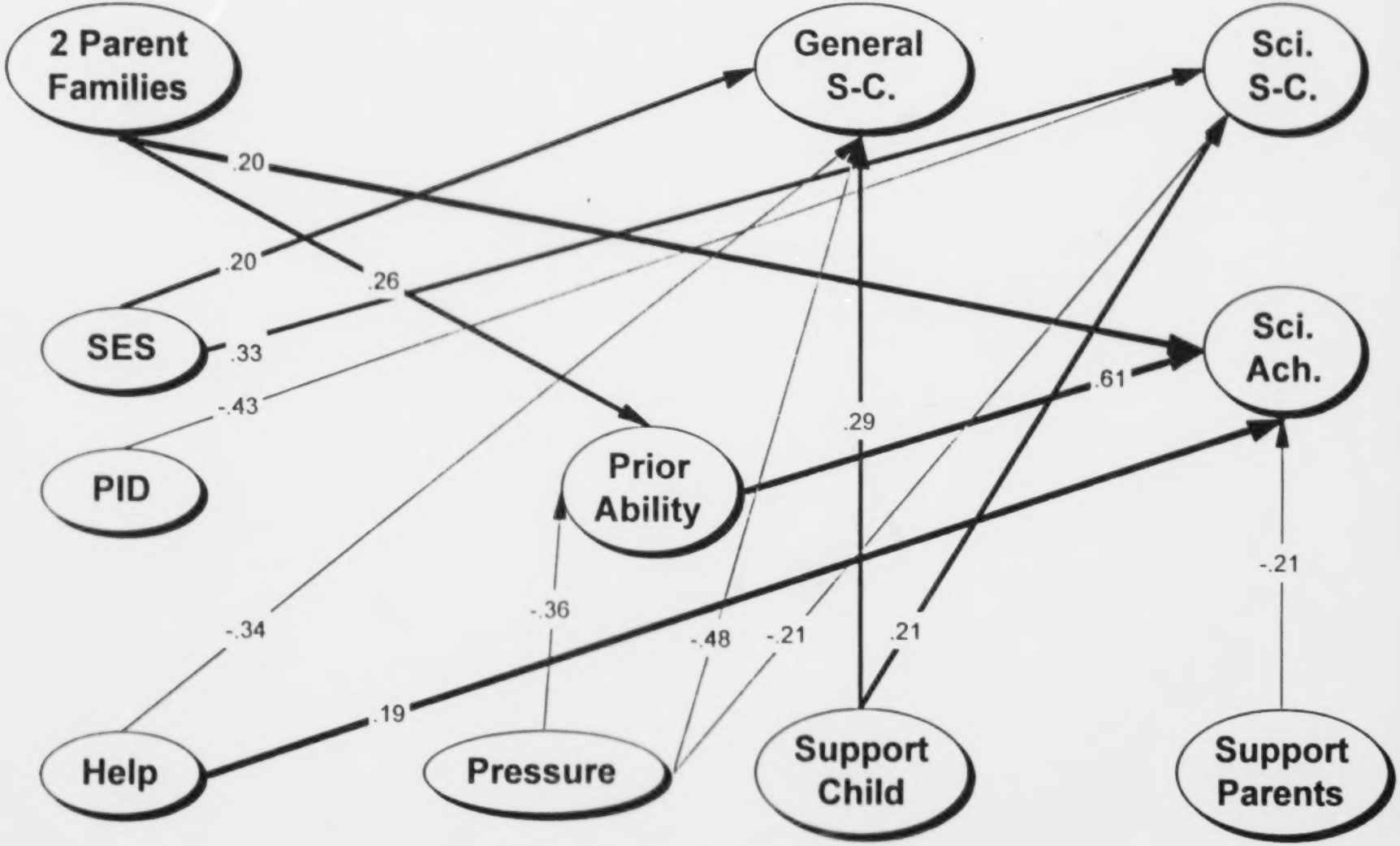

Figure 4.3 Gifted Males Science Achievement

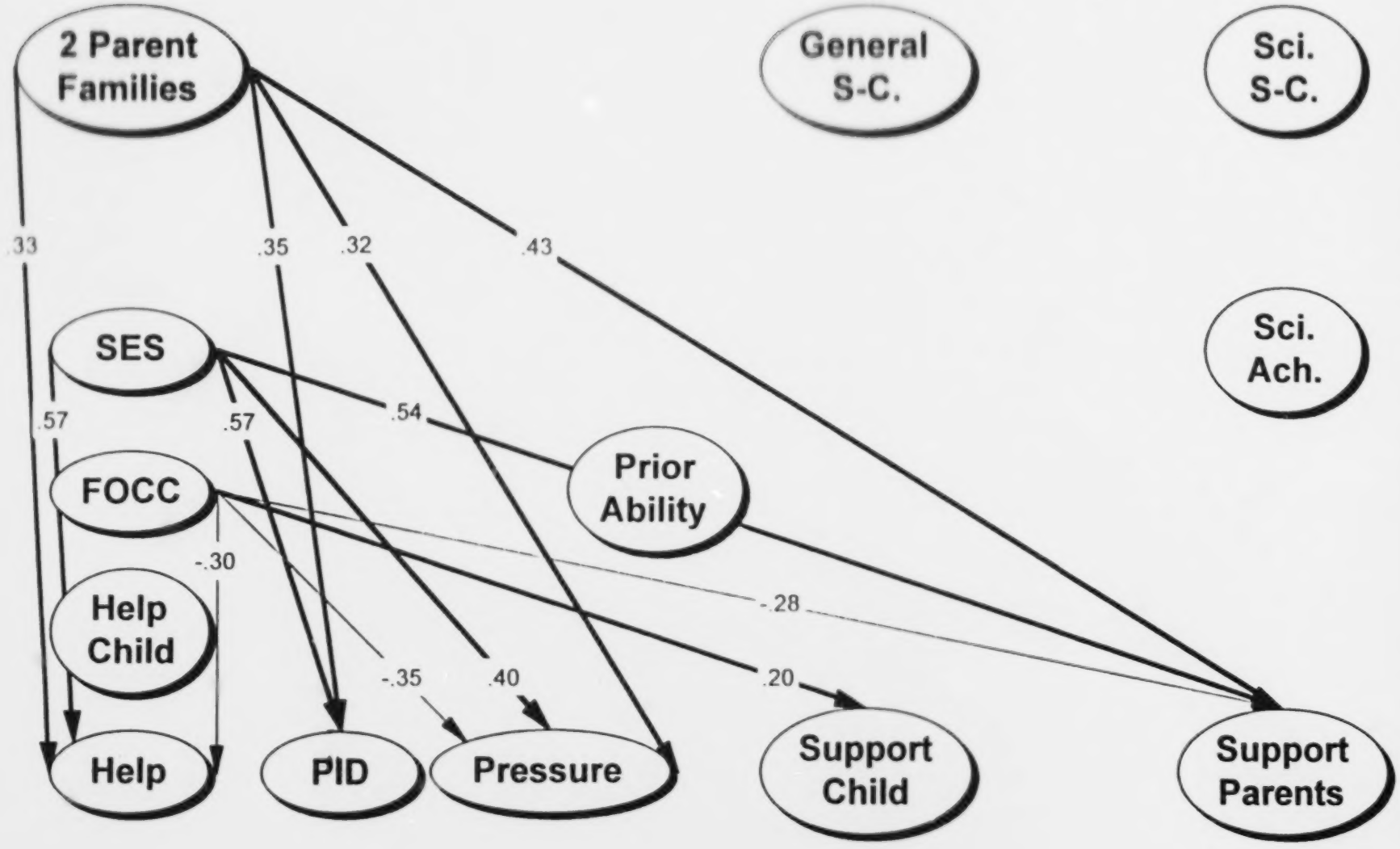

Figure 4.3a. Gifted Males Science Achievement

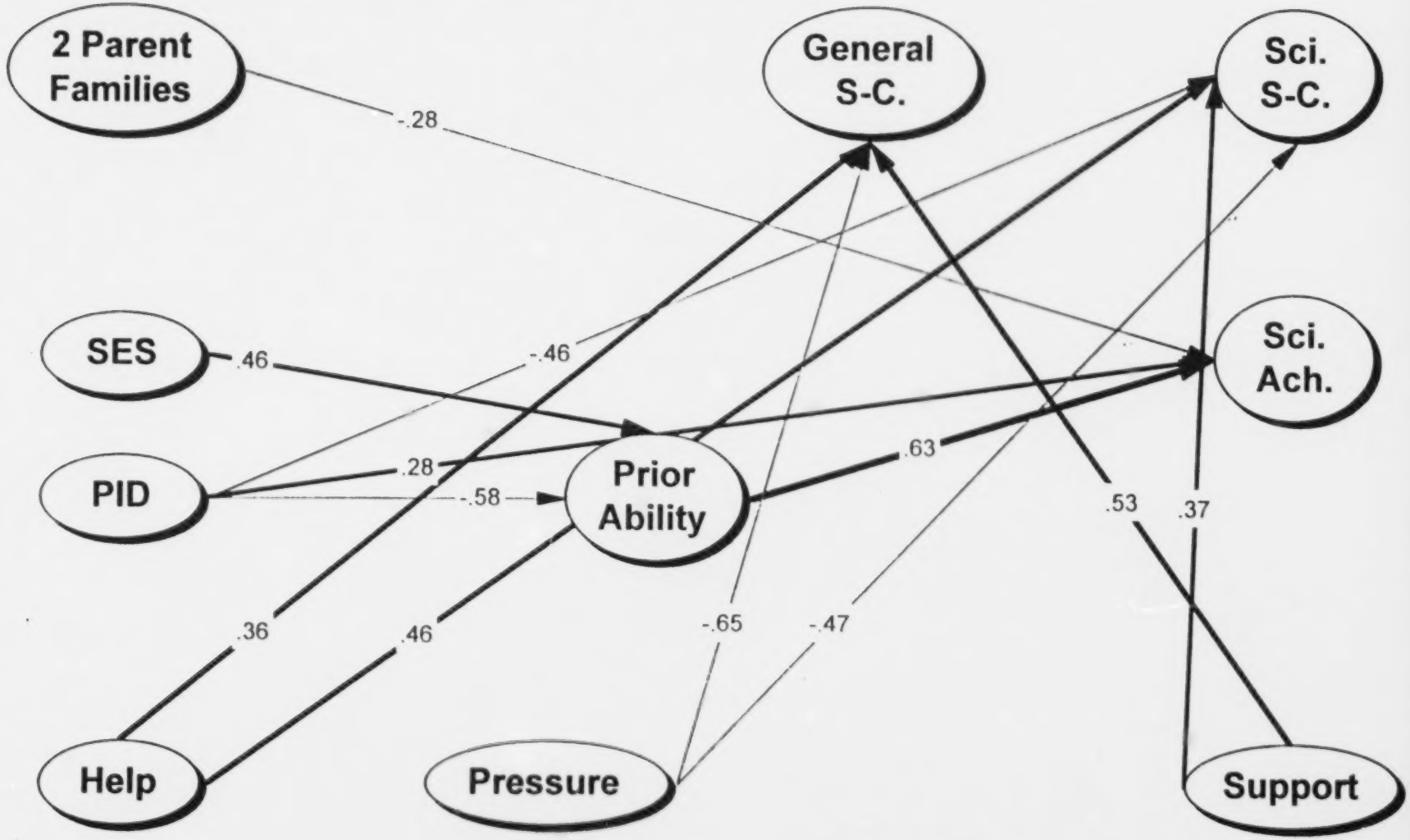

Figure 4.4 Gifted Females Science Achievement

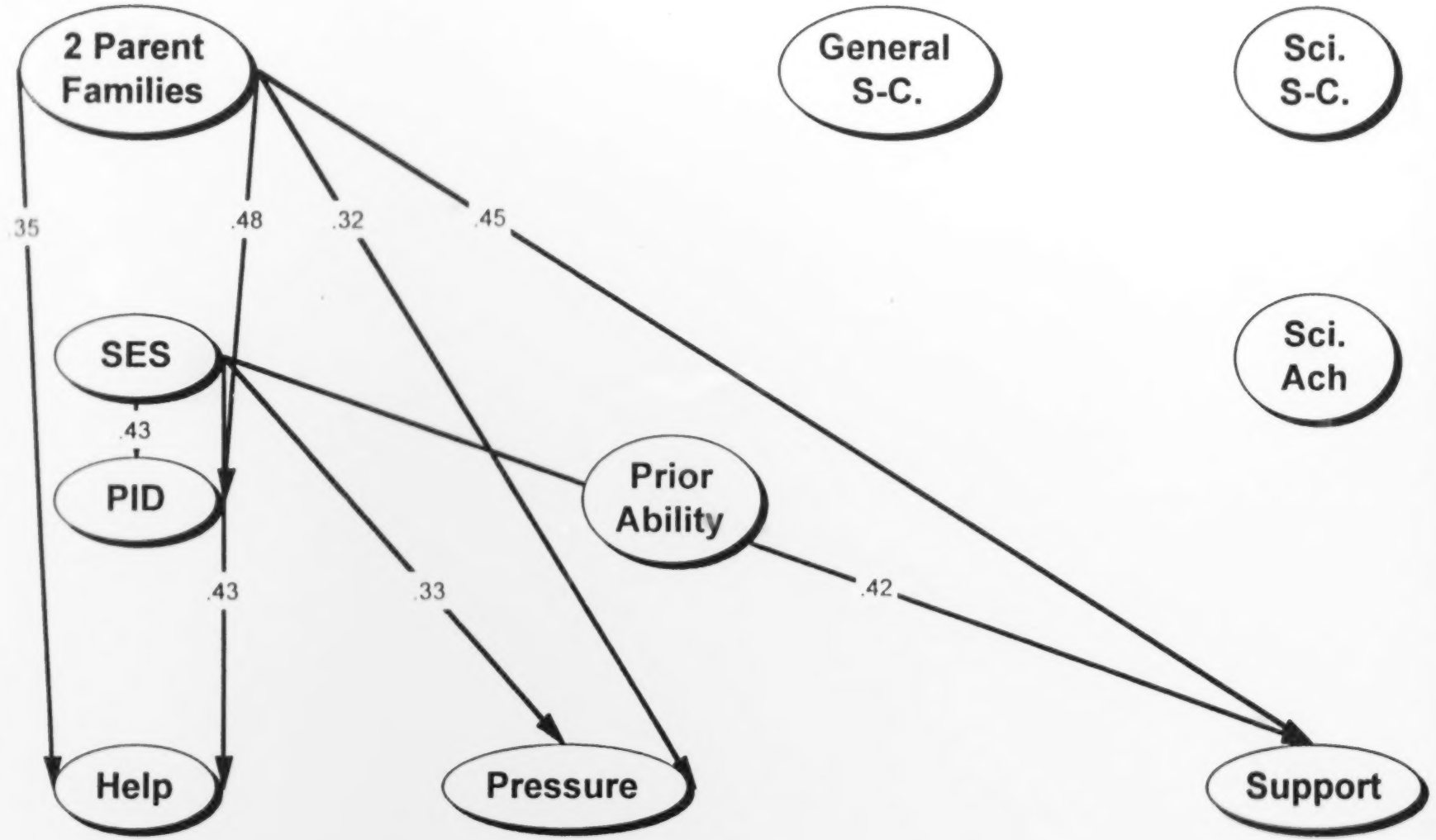

Figure 4.4a. Gifted Females Science Achievement

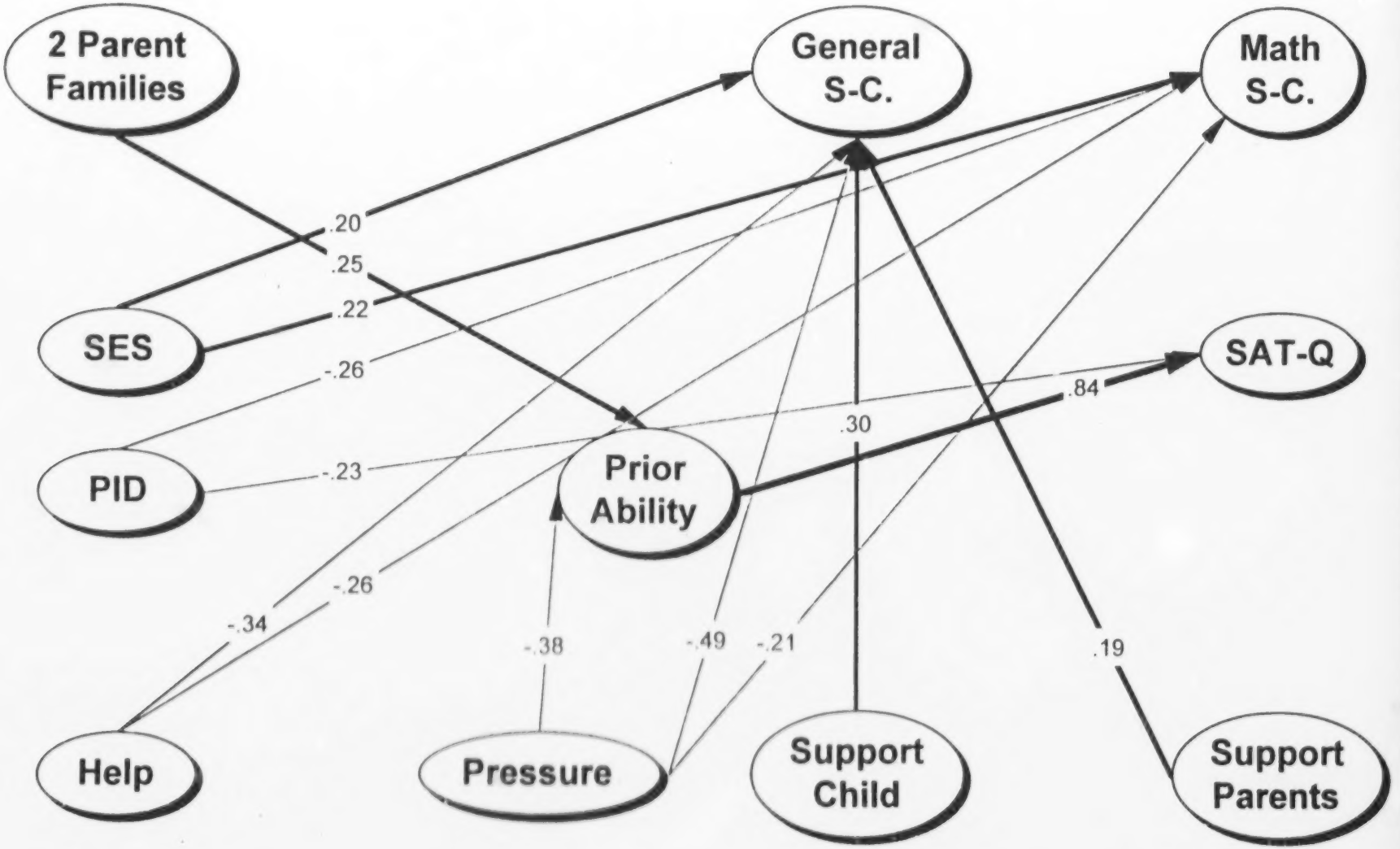

Figure 4.5 Gifted Males SAT-Q Achievement

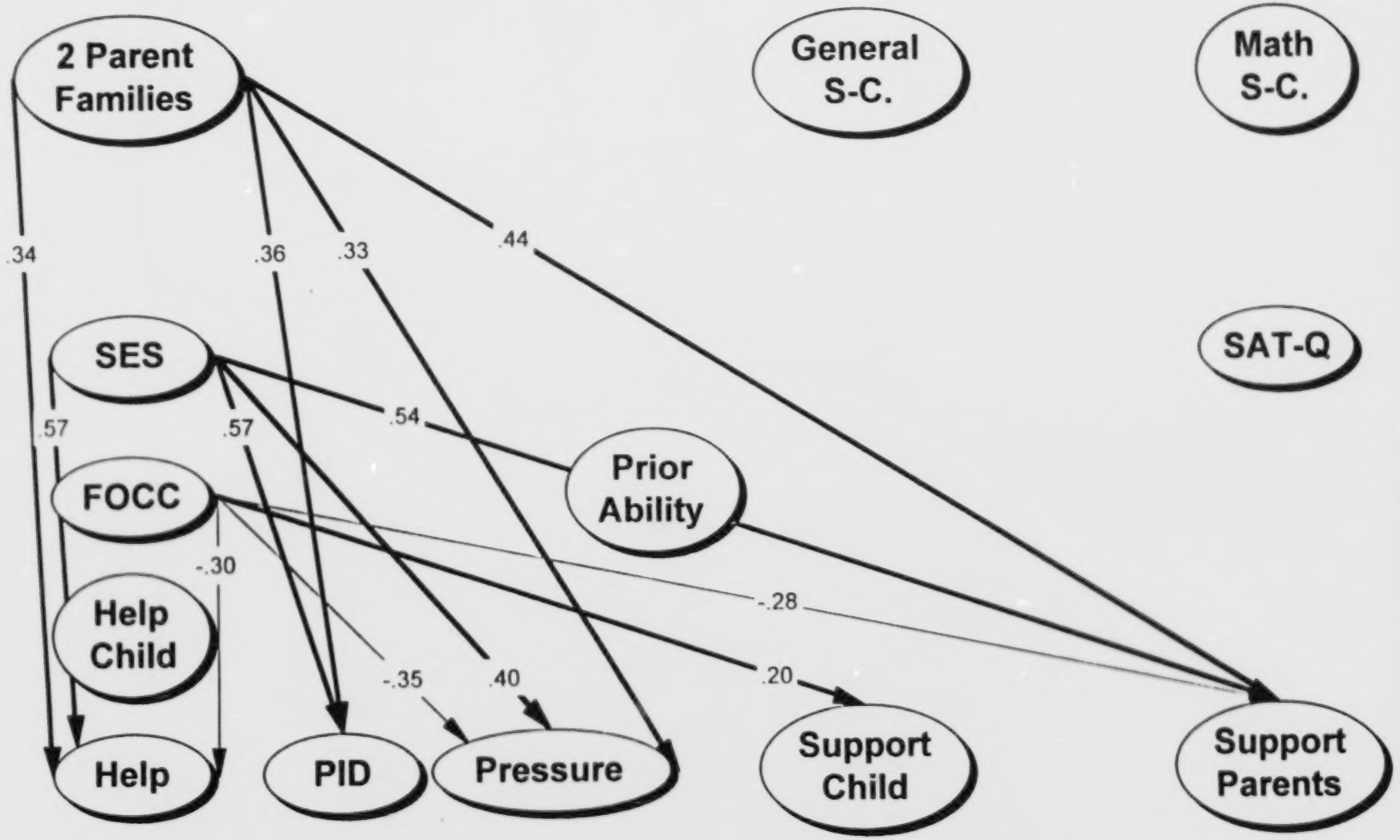

Figure 4.5a. Gifted Males SAT-Q Achievement

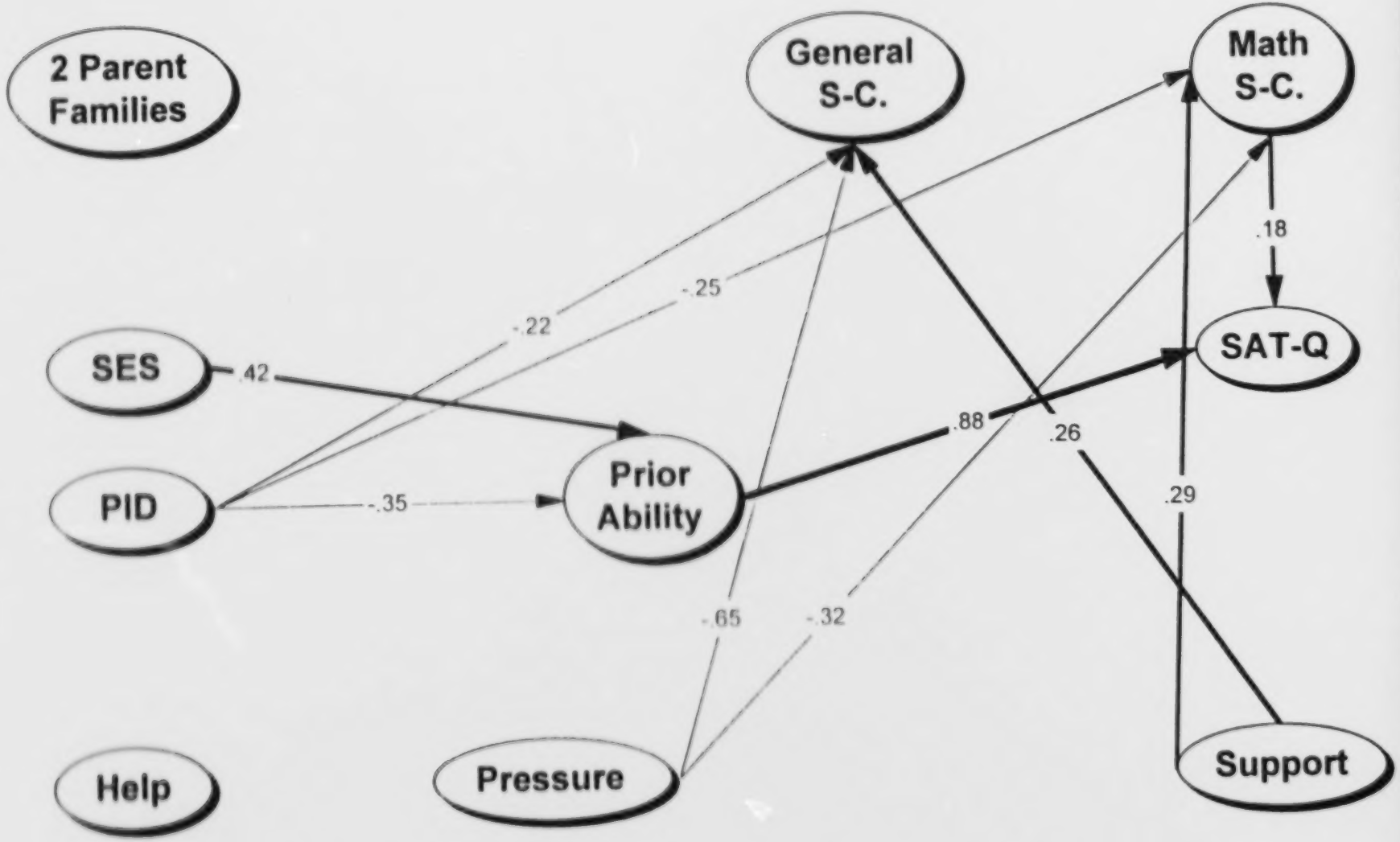

Figure 4.6 Gifted Females SAT-Q Achievement

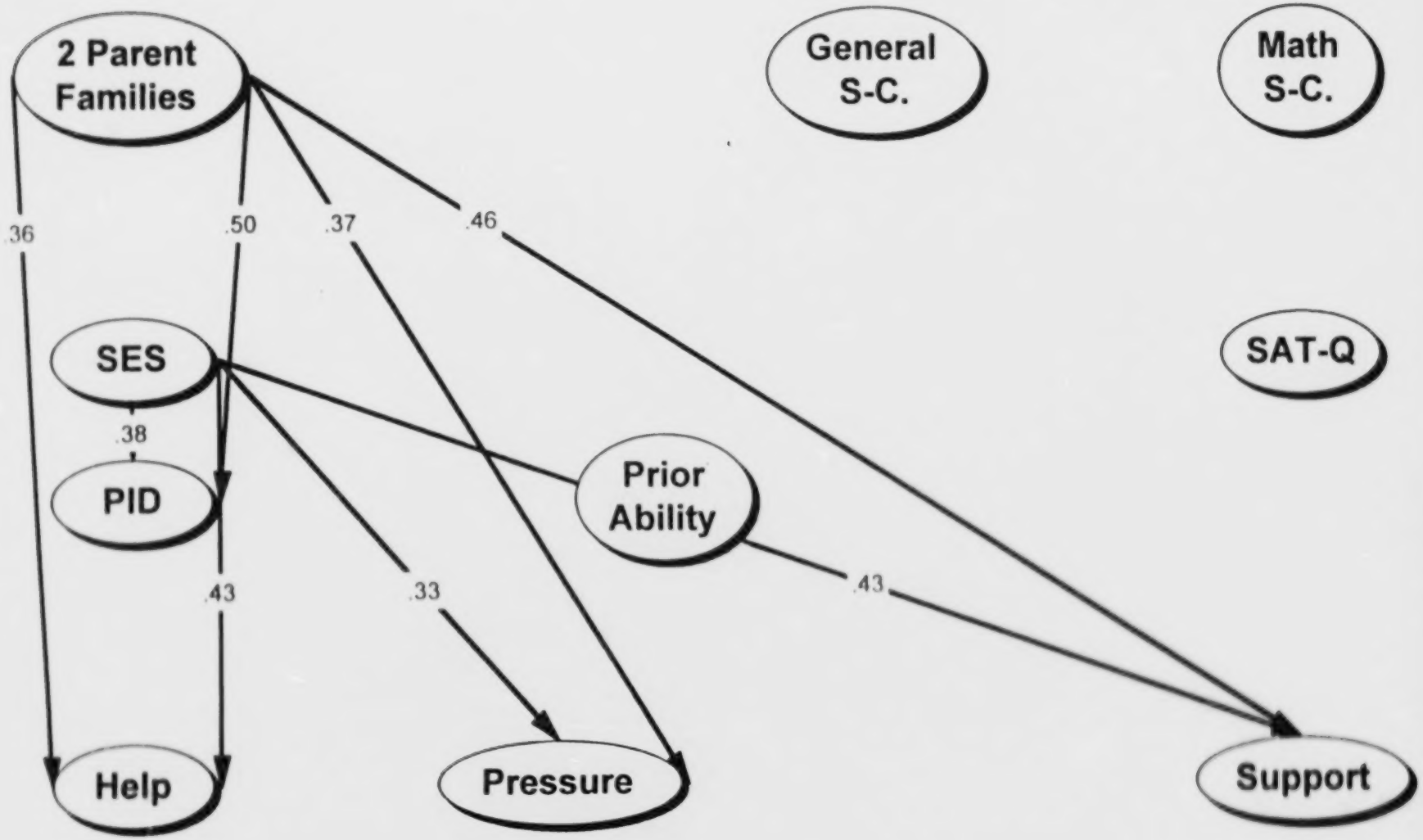

Figure 4.6a. Gifted Females SAT-Q Achievement

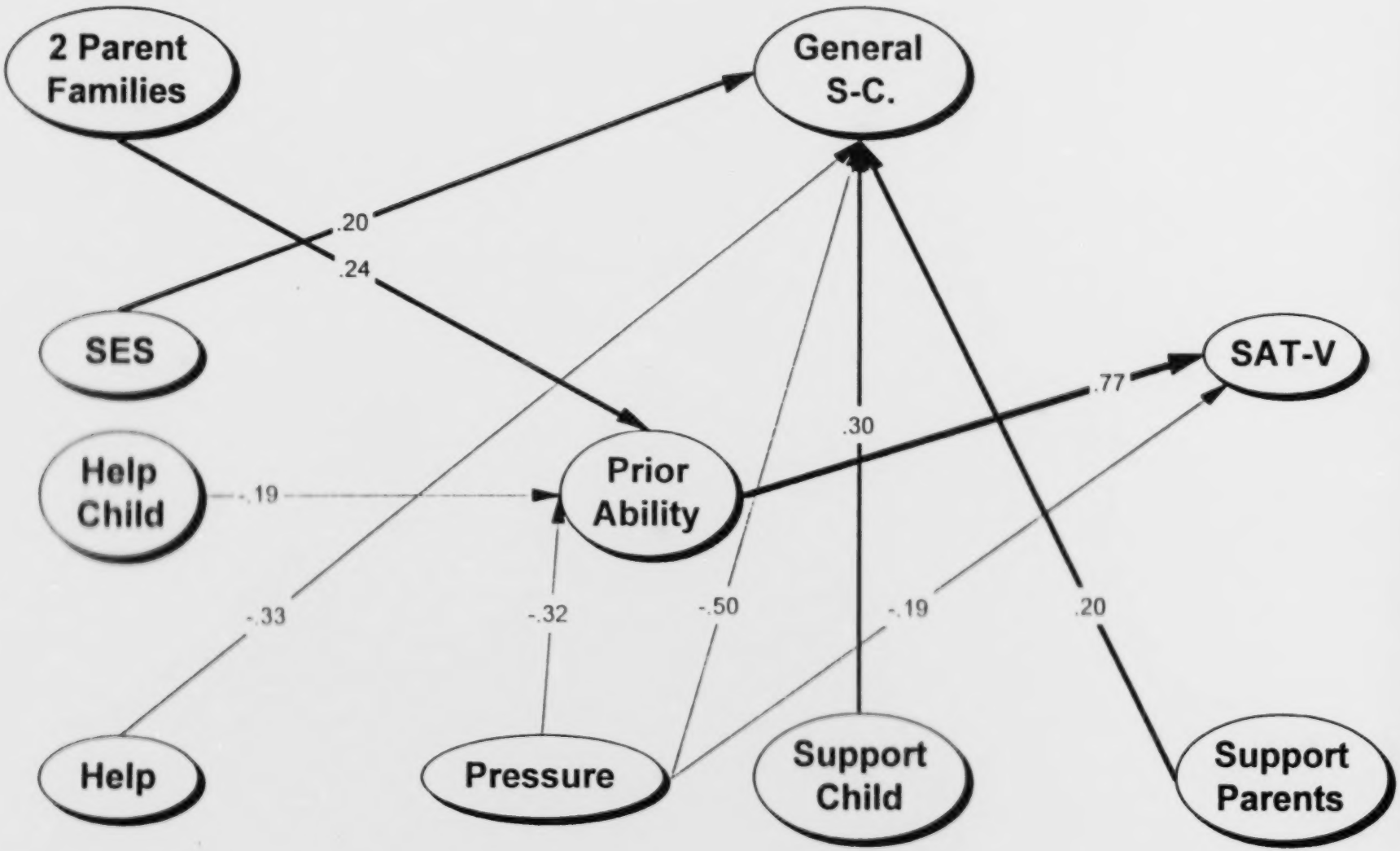

Figure 4.7 Gifted Males SAT-V Achievement

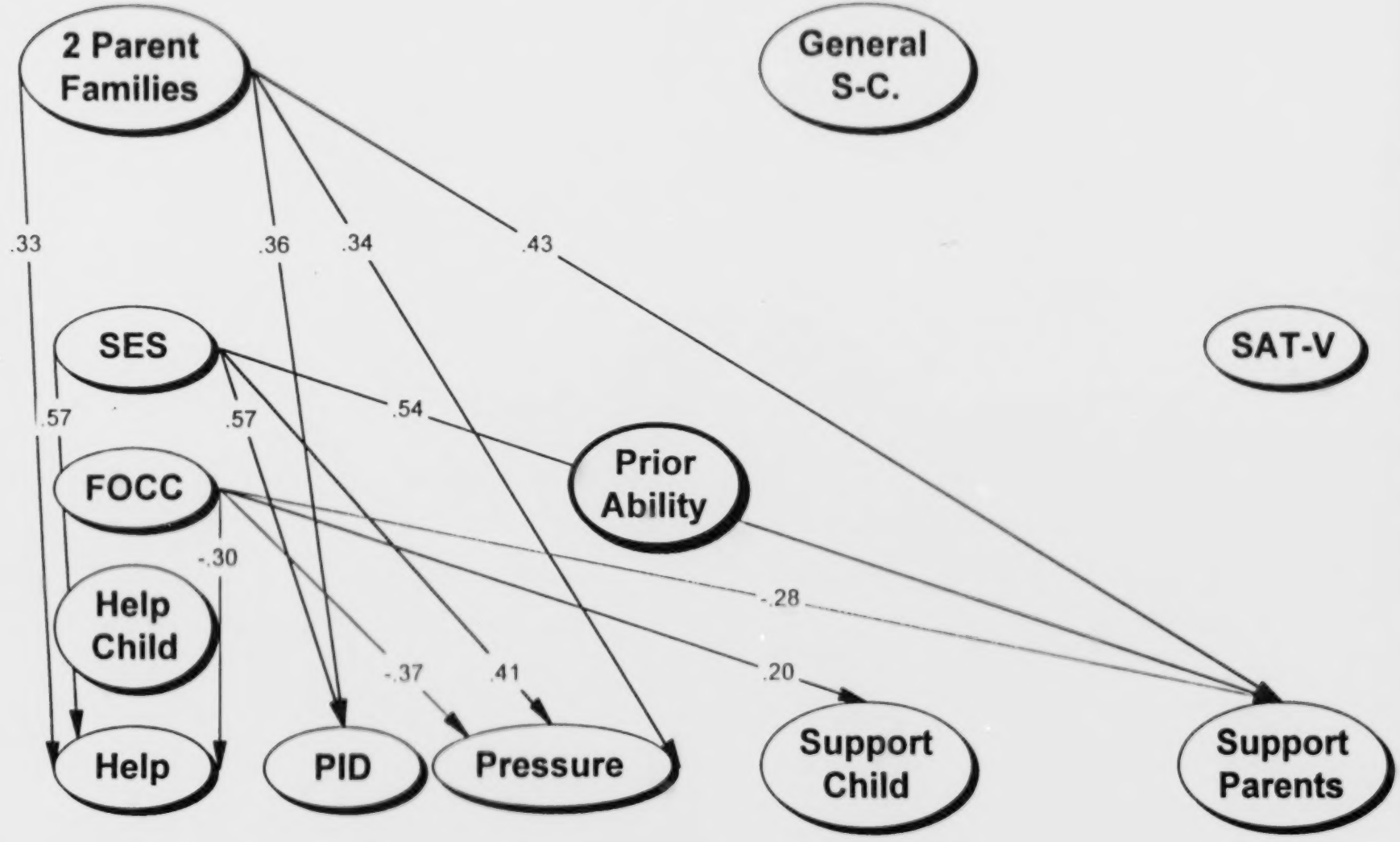

Figure 4.7a. Gifted Males SAT-V Achievement

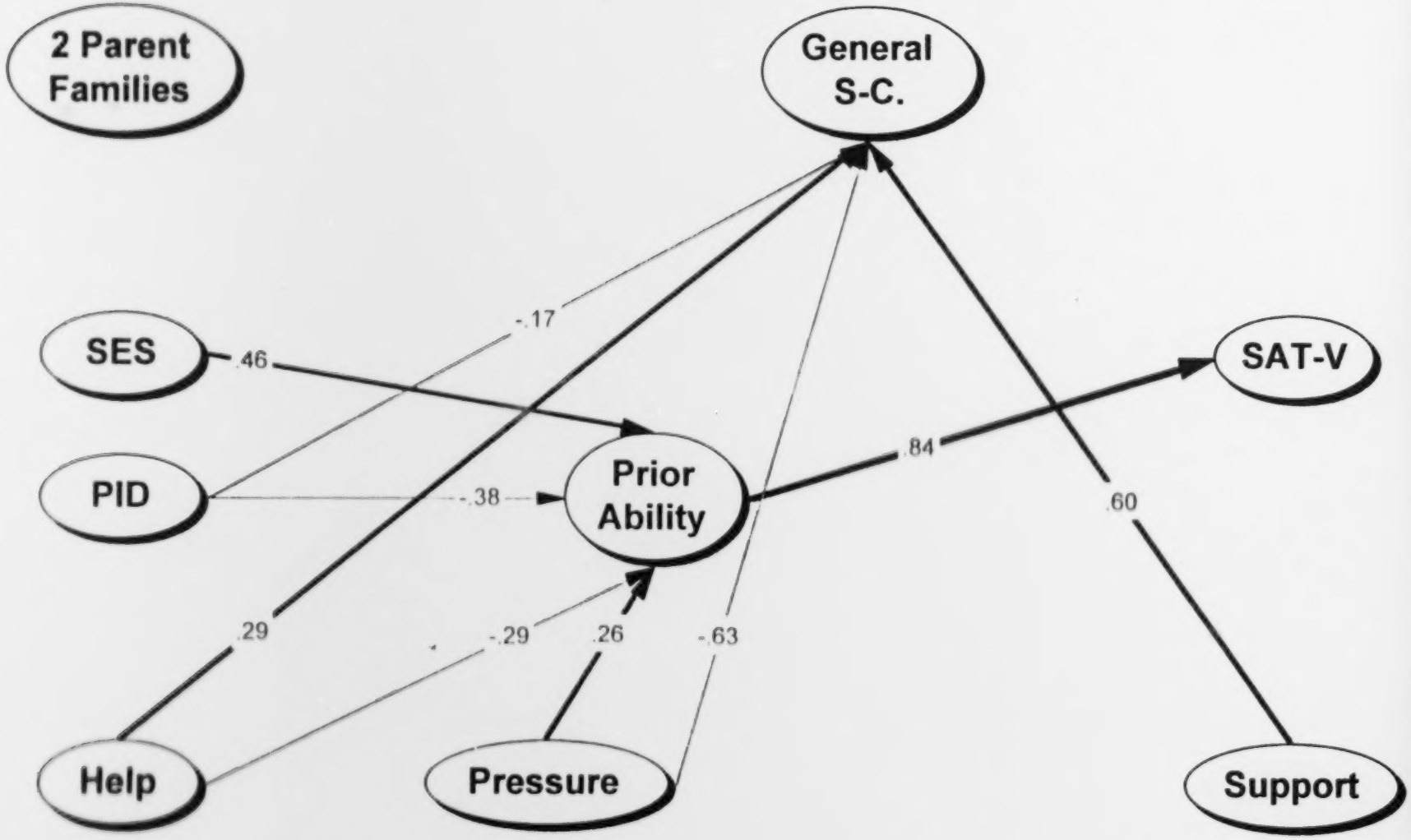

Figure 4.8 Gifted Females SAT-V Achievement

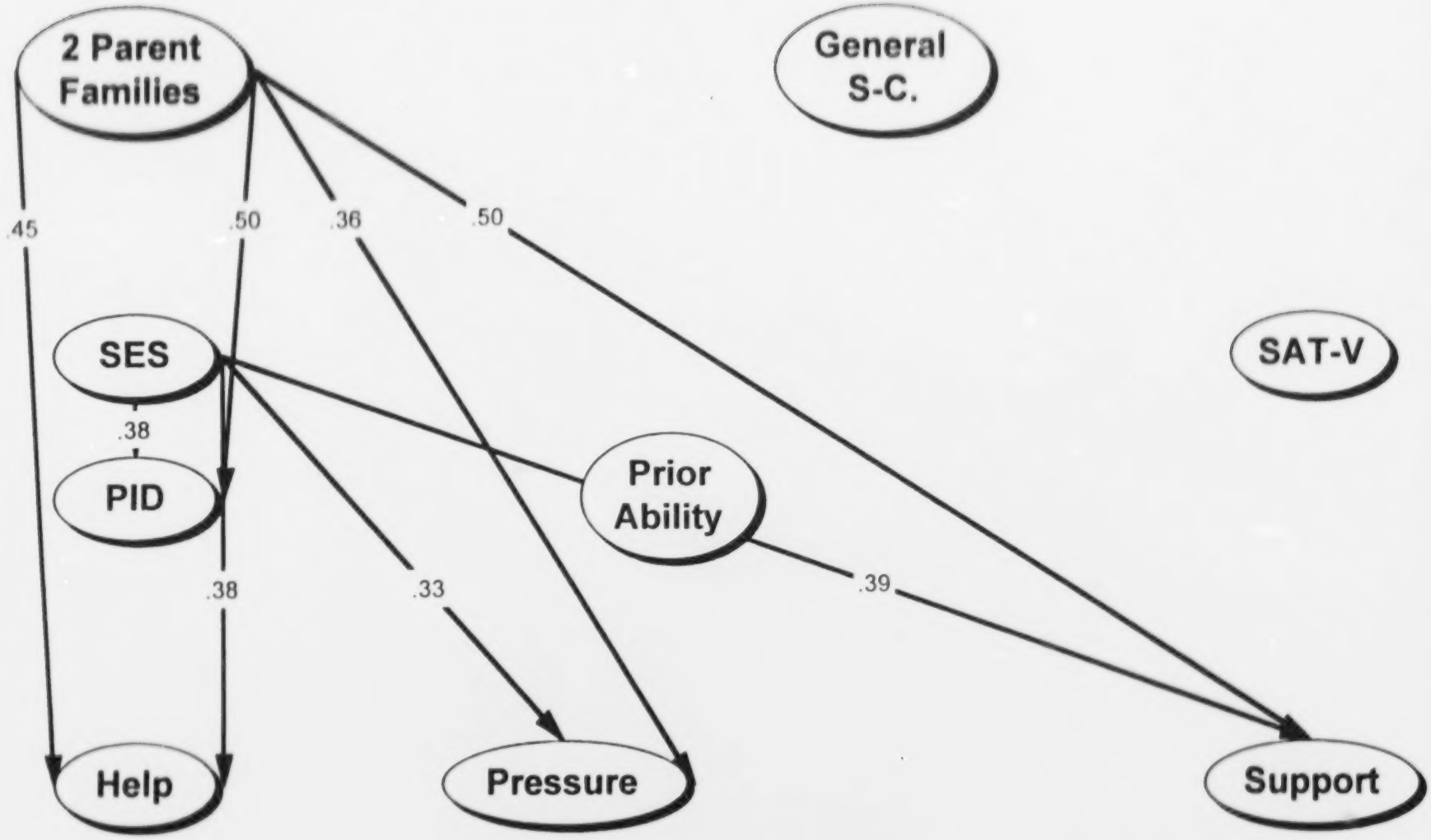

Figure 4.8a. Gifted Females SAT-V Achievement